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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,515	06/23/2005	Tsuyoshi Nakano	Q88663	6621

23373 7590 12/13/2006

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EXAMINER

HARRISON, MONICA D

ART UNIT PAPER NUMBER

2813

DATE MAILED: 12/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/540,515

Applicant(s)

NAKANO ET AL.

Examiner

Monica D. Harrison

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. Applicant's remarks filed 4/24/06 have been entered.

#### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saito et al (5,762,706) in view of Kudo et al (5,495,115).

2. Regarding claim 1, Saito et al discloses a compound semiconductor epitaxial substrate for use in a pseudomorphic high electron mobility field effect transistor, comprising an InGaAs layer as a channel layer (Figure 7a, reference 103) and an InGaP layer containing n-type impurities as a front side electron supplying layer (Figure 7a, reference 104). However, Saito et al does not disclose said InGaAs layer having an electron mobility at room temperature (300 K) of 8000 cm<sup>2</sup>/V.s or more.

Kudo et al discloses said InGaAs layer having an electron mobility at room temperature (300 K) (column 6, lines 11-20) however, Kudo et al does not disclose the room temperature of 8000 cm<sup>2</sup>/V.s or more.

It would have been obvious, at the time the invention was made, for one having ordinary skill in the art, to provide a room temperature (300 K) of 8000 cm<sup>2</sup>/V.s or more, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the "optimum range" involves only routine skill in the art. *In re Aller*, 105 USPQ 233 (1955).

It is obvious, at the time the invention was made, for one having ordinary skill in the art, to modify Saito et al, with the teachings of Kudo et al, for the purpose of forming a semiconductor crystalline laminate structure.

3. Regarding claim 2, Kudo et al discloses further comprising an InGaP layer as a front side spacer layer between said channel layer and said front side electron supplying layer (Figure 9, references 52 and 57).

4. Regarding claim 3, Kudo et al discloses further comprising an InGaP layer containing n-type impurities also as a back side electron supplying layer and comprising an InGaP layer as a back side spacer layer between said channel layer and said back side electron supplying layer (Figure 9, reference 52).

5. Regarding claim 4, Saito et al discloses wherein an In composition of the InGaAs layer constituting of said channel layer is 0.25 or more (Figure 7a, reference 103).

6. Regarding claim 5, Saito et al discloses wherein GaAs layers each of which has a thickness of 4 nm or more are laminated on said channel layer in contact with a top surface and a bottom surface of said channel layer, respectively (Figure 7a, references 101, 102 and 105).

7. Regarding claims 6-8, Kudo et al discloses an epitaxial layer of each compound semiconductor is formed by employing an MOCVD method (column 10, lines 46-63).

#### ***Response to Arguments***

8. Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection.

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*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica D. Harrison whose telephone number is 571-272-1959. The examiner can normally be reached on M-F 7:00am-3:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Monica D. Harrison  
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mdh  
December 7, 2006

  
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